

WHAT IS CLAIMED IS:

- 1 1. A system for ultrasonic imaging, comprising:
 - 2 a signal generator unit for generating at least two out-of-phase pulses;
 - 3 a signal transmitter unit coupled to said signal generator unit for transmitting
 - 4 said at least two out-of-phase pulses into media of interest;
 - 5 a receiver and raw data averager unit for receiving said at least two out-of-phase
 - 6 pulses modified by said media of interest; and
 - 7 a data processing unit coupled to said receiver and raw data averager unit.

- 1 2. The system of claim 1, wherein said signal generator unit is a digital
 - 2 waveform generator.

- 1 3. The system of claim 1, wherein said signal generator unit modulates an
 - 2 amplitude of at least two out-of-phase sine waves, which produce said at
 - 3 least two out-of-phase pulses.

- 1 4. The system of claim 1, wherein said signal generator unit modulates a
 - 2 frequency of at least two out-of-phase sine waves, which produce said at
 - 3 least two out-of-phase pulses.

1 5. The system of claim 1, wherein said signal generator unit modulates a
2 pulse width of at least two out-of-phase sine waves, which produce said at
3 least two out-of-phase pulses.

1 6. The system of claim 1, wherein said signal generator unit convolves at
2 least two out-of-phase sine waves with an envelope function to produce
3 said at least two out-of-phase pulses.

1 7. The system of claim 6, wherein said envelope function is a Gaussian
2 waveform.

1 8. The system of claim 6, wherein said envelope function is a chirped
2 waveform.

1 9. The system of claim 6, wherein said at least two out-of-phase sine waves
2 are modulated in a way to produce a chirped Gaussian pulse width
3 modulated waveform.

1 10. The system of claim 1 wherein said signal transmitter unit comprises a
2 power amplifier, a transmit/receive switch, and a transducer.

- 1 11. The system of claim 10, further comprising a digital delay circuit.
- 1 12. The system of claim 10, further comprising an analog delay circuit.
- 1 13. The system of claim 10, further comprising a channel gain circuit.
- 1 14. The system of claim 1, wherein said at least two out-of-phase pulses are
2 alternately transmitted by said signal transmitter unit to produce a pulse
3 set.
- 1 15. The system of claim 1, wherein said receiver and raw data averager unit
2 comprises a transducer, a transmit/receive switch, an analog-to-digital
3 converter, and an averager.
- 1 16. The system of claim 15, wherein said receiver and raw data averager unit
2 further comprises a power amplifier, a bandpass filter, and a baseband
3 filter.
- 1 17. The system of claim 15, wherein said receiver and raw data averager unit
2 further comprises an in-phase and quadrature mixer.

- 1 18. The system of claim 1, wherein said signal generator unit and said
2 receiver and raw data averager unit share a transducer.
- 1 19. The system of claim 1, wherein said data processing unit comprises an in-
2 phase and quadrature mixer, a digital signal processor, an acoustic image
3 data buffer, and a scan converter.
- 1 20. The system of claim 1, wherein said data processing unit comprises an in-
2 phase and quadrature mixer, an application specific integrated circuit, an
3 acoustic image data buffer, and a scan converter.
- 1 21. The system of claim 1, further comprising an image display unit coupled
2 to said data processing unit.
- 1 22. The system of claim 21, wherein said image display unit is a computer
2 monitor.
- 1 23. The system of claim 21, wherein said image display unit is a flat-panel
2 display.

1 24. The system of claim 21, wherein said image display unit is a liquid-crystal
2 display